

Dapeng Feng
Department of Earth System Science
Stanford University
473 Via Ortega, Y2E2 Room 370, Stanford, CA 94305
dpfeng@stanford.edu

EDUCATION

The Pennsylvania State University Doctor of Philosophy in Civil Engineering (Hydrology)	<i>University Park, USA</i> Aug 2018 – Aug 2023
Peking University Master of Engineering in Energy and Resources Engineering (Water Resources)	<i>Beijing, China</i> Sep 2015 – Jul 2018
Wuhan University Bachelor of Engineering in Hydraulic Engineering	<i>Wuhan, China</i> Sep 2011 – Jun 2015

PROFESSIONAL APPOINTMENT

Stanford University Earth System Science Postdoctoral Scholar Human-Centered Artificial Intelligence Postdoctoral Fellow	<i>Stanford, USA</i> Aug 2023 – Present Aug 2023 – Jul 2024
---	---

AWARDS & HONORS

<i>Water Resources Research</i> Top Downloaded Article Feng et al., 2022	2024
HAI Postdoctoral Fellowship Institute for Human-Centered Artificial Intelligence, Stanford University	2023
Editors' Choice Award, <i>Water Resources Research</i> Ma, Feng et al., 2021	2023
<i>Water Resources Research</i> Top Cited Article Ma, Feng et al., 2021	2023
Young Scientists Summer Program Fellowship International Institute for Applied Systems Analysis (IIASA)	2022
<i>Water Resources Research</i> Top Cited Article Feng et al., 2020	2022
C. Norwood Wherry Memorial Graduate Fellowship in Engineering College of Engineering, Penn State University	2021
James E. Marley Graduate Fellowship in Engineering College of Engineering, Penn State University	2020
University Graduate Fellowship Penn State University	2018

PUBLICATIONS

Citations: 2238 H index: 15 as of September 29, 2025 (Google Scholar)

- 20) Yang, Y., Pan, M., **Feng, D.**, Xiao, M., Dixon, T., Hartman, R., ... & Ralph, F. M. (2025). Improving streamflow simulation through machine learning-powered data integration and its potential for forecasting in the Western US. *Hydrology and Earth System Sciences*, 29(20), 5453-5476.
- 19) Yang, Y., **Feng, D.**, Beck, H. E., Hu, W., Abbas, A., Sengupta, A., et al. (2025). Global daily discharge estimation based on grid long short-term memory (LSTM) model and river routing. *Water Resources Research*, 61, e2024WR039764.

- 18) McCormick, E. L., Famiglietti, C. A., **Feng, D.**, Michalak, A. M., & Konings, A. G. (2025). Susceptibility to photosynthesis suppression from extreme storms is highly Site-Dependent. *Global Change Biology*, 31(5), e70257.
- 17) **Feng, D.**, Beck, H., de Bruijn, J., Sahu, R., Satoh, Y., Wada, Y., Liu, J., Pan, M., Lawson, K., & Shen, C. (2024). Deep dive into hydrologic simulations at global scale: harnessing the power of deep learning and physics-informed differentiable models (δ HBV-globe1.0-hydroDL). *Geoscientific Model Development*, 17(18), 7181-7198.
- 16) Song, Y., Knoben, W. J., Clark, M. P., **Feng, D.**, Lawson, K., Sawadekar, K., & Shen, C. (2024). When ancient numerical demons meet physics-informed machine learning: adjoint-based gradients for implicit differentiable modeling. *Hydrology and Earth System Sciences*, 28(13), 3051-3077.
- 15) Reichert, P., Ma, K., Höge, M., Fenicia, F., Baity-Jesi, M., **Feng, D.**, & Shen, C. (2023). Metamorphic testing of machine learning and conceptual hydrologic models. *Hydrology and Earth System Sciences*, 28(11), 2505–2529.
- 14) Bindas, T., Tsai, W. P., Liu, J., Rahmani, F., **Feng, D.**, Bian, Y., ... & Shen, C. (2024). Improving river routing using a differentiable Muskingum-Cunge model and physics-informed machine learning. *Water Resources Research*, 60(1), e2023WR035337.
- 13) Rahmani, F., Appling, A., **Feng, D.**, Lawson, K., & Shen, C. (2023). Identifying structural priors in a hybrid differentiable model for stream water temperature modeling. *Water Resources Research*, 59, e2023WR034420.
- 12) Shen, C., Appling, A. P., Gentine, P., Bandai, T., Gupta, H., Tartakovsky, A., ... & Lawson, K. (including **Feng, D.**) (2023). Differentiable modelling to unify machine learning and physical models for geosciences. *Nature Reviews Earth & Environment*, 1-16.
- 11) **Feng, D.**, Beck, H., Lawson, K., & Shen, C. (2023). The suitability of differentiable, physics-informed machine learning hydrologic models for ungauged regions and climate change impact assessment. *Hydrology and Earth System Sciences*, 27(12), 2357-2373.
- 10) Yao, Y., Zhao, Y., Li, X., **Feng, D.**, Shen, C., Liu, C., ... & Zheng, C. (2023). Can transfer learning improve hydrological predictions in the alpine regions?. *Journal of Hydrology*, 625, 130038.
- 9) **Feng, D.**, Liu, J., Lawson, K., & Shen, C. (2022). Differentiable, learnable, regionalized process-based models with multiphysical outputs can approach state-of-the-art hydrologic prediction accuracy. *Water Resources Research*, 58, e2022WR032404. (*Top downloaded article 2022-2023*)
- 8) Fang, K., Kifer, D., Lawson, K., **Feng, D.**, & Shen, C. (2022). The data synergy effects of time-series deep learning models in hydrology. *Water Resources Research*, 58, e2021WR029583.
- 7) Tsai, W.-P., **Feng, D.**, Pan, M., Beck, H., Lawson, K., Yang, Y., Liu, J., & Shen, C. (2021). From calibration to parameter learning: Harnessing the scaling effects of big data in geoscientific modeling. *Nature Communications*, 12(1), 5988.
- 6) **Feng, D.**, Lawson, K., & Shen, C. (2021). Mitigating prediction error of deep learning streamflow models in large data-sparse regions with ensemble modeling and soft data. *Geophysical Research Letters*, 48(14), e2021GL092999.
- 5) Ma, K., **Feng, D.**, Lawson, K., Tsai, W.-P., Liang, C., Huang, X., Sharma, A., & Shen, C. (2021). Transferring hydrologic data across continents – Leveraging data-rich regions to improve hydrologic prediction in data-sparse regions. *Water Resources Research*, 57(5), e2020WR028600. (*Top cited article 2021-2022; Editor’s Choice Award*)
- 4) Zhi, W., **Feng, D.**, Tsai, W.-P., Sterle, G., Harpold, A., Shen, C., & Li, L. (2021). From hydrometeorology to river water quality: Can a deep learning model predict dissolved oxygen at the

continental scale? *Environmental Science & Technology*, 55(4), 2357–2368.

- 3) Ouyang, W., Lawson, K., **Feng, D.**, Ye, L., Zhang, C., & Shen, C. (2021). Continental-scale streamflow modeling of basins with reservoirs: Towards a coherent deep-learning-based strategy. *Journal of Hydrology*, 599, 126455.
- 2) **Feng, D.**, Fang, K., & Shen, C. (2020). Enhancing streamflow forecast and extracting insights using long-short term memory networks with data integration at continental scales. *Water Resources Research*, 56(9), e2019WR026793. (*Top cited article 2020-2021*)
- 1) **Feng, D.**, Zheng, Y., Mao, Y., Zhang, A., Wu, B., Li, J., Tian, Y., & Wu, X. (2018). An integrated hydrological modeling approach for detection and attribution of climatic and human impacts on coastal water resources. *Journal of Hydrology*, 557, 305–320.

REPORTS

Varadharajan, C., Painter, S. L., Kumar, J., Shen, C., Lu, D., Moulton, D., Chen, X., Ombadi, M., **Feng, D.**, Bhanja, S., Weierbach, H., Tsai, W., Willard J., Zhi W., & Sun A. (2022). Chapter 3: Hydrology, in Hickmon et al., **Artificial Intelligence for Earth System Predictability (AI4ESP)** (DOE Workshop Report).

OPEN SOURCE SOFTWARE

- **Feng, D.**, Shen, C., Liu, J., Lawson, K., & Beck, H. (2022). differentiable parameter learning (dPL) + HBV hydrologic model. Zenodo. <https://doi.org/10.5281/zenodo.794362>
This model software has been downloaded more than 2000 times since released in September 2022.
- Fang, K., Shen, C., & **Feng, D.** (2021). mhpi/hydroDL: MHPI-hydroDL (v2.0). Zenodo. <https://doi.org/10.5281/zenodo.5015120>

INVITED AND PLENARY PRESENTATIONS

- **Feng, D.**, (2025). Empowering land surface modeling via differentiable hybrid physics-machine learning models. *Advancing Land Modeling for Gulf Coast Resilience Workshop*. Austin, TX, USA. (Invited keynote)
- **Feng, D.**, (2025). Autonomous learning of large-scale watershed functions: from big data via hybrid differentiable Modeling. *Creating Synthesis out of Complexity in Catchment Science*, Gordon Research Conference. New Hampshire, USA. (Invited)
- **Feng, D.**, (2024). Unifying physical models and deep learning for large-scale hydrologic simulation and knowledge discovery. Watershed Dynamics and Hydrological Extremes Group, Department Catchment Hydrology, Helmholtz Centre for Environmental Research - UFZ. (Invited, delivered online)
- **Feng, D.**, (2024). Unifying physical models and deep learning for large-scale hydrologic simulation and knowledge discovery. Department of Earth, Marine and Environmental Sciences, University of North Carolina at Chapel Hill, NC, USA. (Invited)
- **Feng, D.**, Shen, C., Beck, H., de Bruijn, J., Sahu, R. K., Satoh, Y., Wada, Y., ... & Lawson, K. (2023). Harnessing the power of deep learning and physics-informed differentiable models for accurate global hydrologic modeling. *American Geophysical Union Fall Meeting*. San Francisco, CA, USA. (Invited 20-minute long talk)
- **Feng, D.**, (2023). Differentiable hydrologic models: unifying deep learning and physical models for large scale simulation. Center for Western Weather and Water Extremes, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA, USA. (Invited)

- **Feng, D.**, (2023). Hydrologic deep learning and its integration with physics using differentiable modeling. Remote Sensing Ecohydrology Group, Department of Earth System Science, Stanford University, Stanford, CA, USA. (Invited)
- **Feng, D.**, (2022). Hydrologic deep learning and its integration with physical models. Department Systems Analysis, Integrated Assessment and Modelling, Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland. (Invited)
- **Feng, D.**, Shen, C., Liu, J., & Lawson, K., (2022). Differentiable, learnable, regionalized process-based models with physical outputs can approach state-of-the-art hydrologic prediction accuracy. *HydroML Symposium*. State College, PA, USA. (Plenary)

SELECTED FIRST AUTHOR PRESENTATIONS

- **Feng, D.**, & Shen, C. (2024). Differentiable, Hybrid Hydrologic Modeling to Inform Structure Learning and Elucidate Hydrologic Functions. *American Geophysical Union Fall Meeting*. Washington, D.C., USA (Oral)
- **Feng, D.**, Holtzman, N., Liu, Y., Tan, Z., Anderson, M., Holmes, T. R., ... & Konings, A. G. (2024). Multi-source Remote Sensing Data Integration to Characterize Plant-Water Interactions via Differentiable, Physics-Informed Machine Learning. *American Geophysical Union Fall Meeting*. Washington, D.C., USA (Oral)
- **Feng, D.**, Holtzman, N., Liu, Y., Tan, Z., & Konings, A. G. (2024). Physics-Informed Differentiable Modeling for Learning Hydrologic Functions from Large Observations. *The Conference on Computational Methods in Water Resources 2024*. (Oral, delivered online)
- **Feng, D.**, Holtzman, N., Liu, Y., Tan, Z., & Konings, A. G. (2024). Global-scale retrievals of leaf water potential using physics-informed machine learning and remote sensing data integration. *HydroML Symposium*. Richland, WA, USA. (Oral)
- **Feng, D.**, Shen, C., Li, L., & Sadayappan, K. (2023). Differentiable modeling towards integrating physics and machine Learning provides valuable opportunities for learning hydrologic functions and knowledge from large Data. *American Geophysical Union Fall Meeting*. San Francisco, CA, USA. (Oral)
- **Feng, D.**, & Shen, C. (2023). A differentiable modeling approach to systematically integrating deep learning and physical models for large scale hydrologic prediction and knowledge discovery. *HydroML Symposium*. Berkeley, CA, USA. (Oral)
- **Feng, D.**, Shen, C., Liu, J., & Lawson, K. (2022). Parameter learning to structure evolution: a deep integration of physical models and deep learning to improve hydrologic modeling at large scales. *American Geophysical Union Fall Meeting*. Chicago, IL, USA. (Oral)
- **Feng, D.**, & Shen, C. (2021). The value of deep learning to the future SWOT mission for improving predictions in ungauged basins. *American Geophysical Union Fall Meeting*. New Orleans, LA, USA. (eLightning)
- **Feng, D.**, & Shen, C. (2020). Leveraging flow duration information to improve streamflow prediction in data-sparse regions with deep learning models. *American Geophysical Union Fall Meeting*. Online. (Poster)
- **Feng, D.**, Shen, C., & Fang, K. (2020). Multisource data integration under a deep learning framework to improve streamflow forecast ability. *100th American Meteorological Society Annual Meeting*. Boston, MA, USA. (Oral)
- **Feng, D.**, Shen, C., & Fang, K. (2019). A flexible deep learning data integration framework to improve streamflow forecast and provide hydrologic insights over the continental US. *American Geophysical Union Fall Meeting*. San Francisco, CA, USA. (Oral)

ACADEMIC ACTIVITIES

- Flood Forecasting Meets Machine Learning Workshop. Google, online. January, 2023.
- Young Scientists Summer Program. International Institute for Applied Systems Analysis, Vienna, Austria.

June-August, 2022.

- Artificial Intelligence for Earth System Predictability (AI4ESP). U.S. Department of Energy, online. November, 2021.
- Scientific Focus Area (SFA) Community Watershed Workshop. Pacific Northwest National Laboratory, Richland, WA, USA. September, 2019.
- Geo for Good Summit. Google, Sunnyvale, CA, USA. September, 2019.
- CUAHSI-NCAR Training Workshop: The Community WRF-Hydro Modeling System. National Center for Atmospheric Research (NCAR), Boulder, CO, USA. June, 2019.
- Runoff Predictions in Ungauged Basins (PUB). International Summer School. Vienna University of Technology, Vienna, Austria. July, 2017.
- Modeling Environment Resilience. International Summer School. École Normale Supérieure, Paris, France. June, 2016.

SERVICE

- Panelist for NASA review panel, proposal reviewer for German Research Foundation
- Reviews for scientific journals: *Geophysical Research Letters*, *Water Resources Research*, *Journal of Hydrology*, *Environmental Modelling & Software*, *Hydrology and Earth System Sciences*, *Hydrological Processes*, *Scientific Reports*, *IEEE Transactions on Geoscience and Remote Sensing*, *Earth's Future*, *Biogeosciences*
- Organizing committee member for the inaugural HydroML Symposium, May 2022
- Co-convenor for the session on Explainable and Hybrid Machine Learning in Hydrology in the EGU General Assembly 2024, 2025